Genetics: The Future of Medicine

Genetic disease was once thought to be limited to a few rare conditions affecting children. It is now known to affect everyone. After years of promise, the field of genetics is finally bearing fruit and will increasingly affect the way medicine is practiced. In addition to environmental influences, every disease has genetic components that determine (1) the likelihood of a specific disease; (2) the age of onset; and (3) the severity.

It is our basic understanding of genetics, along with technological advances, that has allowed us to begin to fulfill our quest for better detection and treatment of disease. Indeed, we are increasing our ability to predict who will develop cancer, heart disease, diabetes and Alzheimer's disease, and help prevent these. Understanding how genetics works helps us to appreciate patterns of disease and how these patterns relate to our current medical dilemmas.

Every individual carries four to five potentially harmful genes related to our ethnic background and ancestral environment. We now have the ability to identify many of these genes. Our understanding of gene function and interaction with other genes and our environment has led us toward a clearer understanding of disease processes.

In each population, there is at least one major gene mutation which predisposes to disease. These mutations have become increasingly prevalent as carriers survive and reproduce. As death rates from infectious disease has decreased, we have observed an increase in genetic disease.

Currently, cancer affects 35% to 50% of the population. Genetic risk assessment provides guidance for cost-effective medical management, decreasing the incidence of disease and death. Cardiovascular disease is beginning to yield to risk assessment and genetic testing, and predisposition to diabetes is on the horizon. Strategies to prevent neurodegenerative diseases for which genetic testing is already available are in the making. It is thought that mechanisms are similar for many of these disorders, raising hope that it will be possible to prevent common diseases such as Alzheimer's and Parkinson's.

Genetic services can reduce the rate of and death from diseases and conditions with a genetic component. This is accomplished by working with health care providers to assess genetic risk, diagnose and appropriately manage individuals and their families.

The Future of Medical Genetics

We know that many genes effect our health. For the first time, we are now able to see differences in genes on a molecular level. Although the amount of information is overwhelming, breakthroughs in technology have allowed us to handle large amounts of data. A new field of "informatics" will let us determine (1) whether a drug has adverse effects on a patient; (2) what therapies will likely be most successful for a patient with a specific disease; (3) high-risk diseases for that patient and; (4) low-risk diseases for that patient.

Genetic Services and Routine Patient Care

The effective delivery of genetic services requires integration with routine medicine, which will enhance care. The Queen's Medical Center has long recognized the importance of integrating genetics services with medical practice. Clinical specialists have been brought together at the Queen's Comprehensive Genetics Center to provide genetics services in a much needed niche for the State of Hawaii and the Pacific Basin. The Queen's Comprehensive Genetics Center is available to help physicians identify patients who are at high-risk for a wide variety of disorders with genetic components. The Center can help to (1) identify patients who would benefit from genetic counseling and/or testing; (2) determine if clinical tests are available for a condition with a genetic component; (3) provide genetic testing for disorders that are common in Hawaii's population; (4) identify laboratories that can provide testing for other genetic disorders; and (5) interpret test results so that a physician and/or patient can make meaningful and helpful decisions about their health care.

The Queen's Genetics Center is a family-centered organization committed to the prevention, diagnosis, treatment and management of conditions with a genetic component. The foundation of our care is offered in the spirit of aloha as guided by the mission and ideals of our founders.

For more information about clinical genetics, please call the Queen's Comprehensive Genetics Center at 537-7633.

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